

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Cancelled)

2. (Currently Amended) The system of claim ~~[[1]]~~ 10, wherein the controller, ~~expander~~ expanders, and zero or more storage devices in each storage subsystem are coupled by a serial interconnect.

3. (Currently Amended) The system of claim ~~[[1]]~~ 9, wherein ~~each of the storage subsystems have expanders at plural levels~~, the intercontroller link ~~connecting~~ couples expanders in the two storage subsystems at a first level, the system further comprising another intercontroller link to ~~connect~~ couple expanders in the two storage subsystems at a second level.

4. (Currently Amended) The system of claim ~~[[1]]~~ 10, wherein each storage subsystem includes serial attached small computer system interface (SAS) phys.

5. (Currently Amended) ~~The system of claim 4,~~ A system, comprising:
plural storage subsystems, each storage subsystem having a controller, an expander, and zero or more storage devices coupled to the expander, the controller to access storage devices through the expander, and the expander having interfaces for coupling to storage devices; and

an intercontroller link to connect expanders in different storage subsystems to enable the controller in one of the storage subsystems to communicate with the controller in another one of the storage subsystems through the expanders and the intercontroller link,
wherein each storage subsystem includes serial attached small computer system interface (SAS) phys,

wherein at least one of the expanders includes a SAS phy connected to the intercontroller link, wherein the at least one of the expanders includes a route table for the SAS phy, the route table containing a plurality of entries for routing information in the storage subsystem.

1 6. (Original) The system of claim 5, wherein each of the expanders includes a route
2 table for the SAS phy connected to the intercontroller link, and the route table is programmed
3 differently than route tables for SAS phys not connected to the intercontroller link.

1 7. (Currently Amended) ~~The system of claim 4,~~ A system, comprising:
2 plural storage subsystems, each storage subsystem having a controller, an
3 expander, and zero or more storage devices coupled to the expander, the controller to access
4 storage devices through the expander, and the expander having interfaces for coupling to storage
5 devices;
6 an intercontroller link to connect expanders in different storage subsystems to
7 enable the controller in one of the storage subsystems to communicate with the controller in
8 another one of the storage subsystems through the expanders and the intercontroller link,
9 wherein each storage subsystem includes serial attached small computer system
10 interface (SAS) phys,
11 wherein each of the expanders includes one or more SAS phys connected to the
12 intercontroller link and one or more SAS phys connected to other components of the storage
13 subsystem, ~~the system further comprising; and~~
14 SAS discovery software to access the storage subsystem subsystems,
15 wherein the one or more SAS phys connected to other components of the storage
16 subsystem are visible to ~~normal~~ the SAS discovery software but the one or more SAS phys
17 connected to the intercontroller link are not visible to the SAS discovery software.

1 8. (Currently Amended) The system of claim ~~[[1]]~~ 10, further comprising:
2 plural computers comprising respective plural storage subsystems.

1 9. ~~(Currently Amended) The system of claim 1;~~ A system, comprising:
2 plural storage subsystems, each storage subsystem having a controller, an
3 expander, and zero or more storage devices coupled to the expander, the controller to access
4 storage devices through the expander, and the expander having interfaces for coupling to storage
5 devices; and
6 an intercontroller link to connect expanders in different storage subsystems to
7 enable the controller in one of the storage subsystems to communicate with the controller in
8 another one of the storage subsystems through the expanders and the intercontroller link,
9 wherein each of the two storage subsystems has expanders at plural levels, the
10 intercontroller link coupling expanders in the two storage subsystems.

1 10. ~~(Currently Amended) The system of claim 1;~~ A system, comprising:
2 plural storage subsystems, each storage subsystem having a controller, an
3 expander, and zero or more storage devices coupled to the expander, the controller to access
4 storage devices through the expander, and the expander having interfaces for coupling to storage
5 devices; and
6 an intercontroller link to connect expanders in different storage subsystems to
7 enable the controller in one of the storage subsystems to communicate with the controller in
8 another one of the storage subsystems through the expanders and the intercontroller link,
9 wherein each of the two storage subsystems has expanders at plural levels,
10 wherein each of the expanders is coupled to zero or more storage devices.

1 11. (Original) The system of claim 10, wherein at least some of the expanders are
2 coupled to one or more storage devices.

1 12. (Original) The system of claim 11, wherein the controller in each of the two
2 storage subsystems is adapted to access the storage devices through one or more expanders.

1 13. (Cancelled)

1 14. (Currently Amended) ~~The method of claim 13,~~ A method for use in a system
2 having plural storage subsystems, each storage subsystem having a controller and an expander,
3 the method comprising:
4 accessing, by the controller in a first one of the storage subsystems, a storage
5 device in the first storage subsystem through the expander in the first storage subsystem;
6 communicating over an intercontroller link that connects the expander in the first
7 storage subsystem with an expander in a second one of the storage subsystems, wherein the
8 controller in the first storage subsystem communicates with the controller in the second storage
9 subsystem through the intercontroller link and the expanders in the first and second storage
10 subsystems,
11 wherein each of the expanders in the first and second storage subsystems includes
12 a SAS phy connected to the intercontroller link, ~~the method further comprising:~~
13 providing a routing table for the SAS phy in each of the first and second storage
14 subsystems; and
15 populating a plurality of entries in the routing table with routing information.

1 15. (Currently Amended) ~~The method of claim 13,~~ A method for use in a system
2 having plural storage subsystems, each storage subsystem having a controller and an expander,
3 the method comprising:
4 accessing, by the controller in a first one of the storage subsystems, a storage
5 device in the first storage subsystem through the expander in the first storage subsystem; and
6 communicating over an intercontroller link that connects the expander in the first
7 storage subsystem with an expander in a second one of the storage subsystems, wherein the
8 controller in the first storage subsystem communicates with the controller in the second storage
9 subsystem through the intercontroller link and the expanders in the first and second storage
10 subsystems,
11 wherein each of the expanders in the first and second storage subsystems includes
12 one or more SAS phys connected to the intercontroller link and one or more SAS phys connected
13 to other components of the storage subsystem, ~~the method further comprising;~~
14 enabling the one or more SAS phys connected to other components of the storage
15 subsystems to be visible to normal SAS discovery software; and
16 maintaining the one or more SAS phys connected to the intercontroller link not
17 visible to the SAS discovery software.

1 16. (Currently Amended) The method of claim ~~[[13]]~~ 14, further comprising
2 accessing, by the controller in the second storage subsystem, a storage device in the second
3 storage subsystem through the expander in the second storage subsystem.

1 17. (Currently Amended) The method of claim ~~[[13]]~~ 14, further comprising the
2 controllers in the first and second storage subsystems communicating with each other over the
3 intercontroller link to maintain cache coherency.

1 18. – 19. (Cancelled)

1 20. (Currently Amended) ~~The expander of claim 19, further comprising~~ An expander
2 in a first storage subsystem, comprising:

3 a first interface to couple to a storage device;

4 a second interface to couple to an intercontroller link to connect the expander in
5 the first storage subsystem with an expander in a second storage subsystem;

6 a controller to communicate with another controller in the second storage
7 subsystem through the second interface and the intercontroller link,

8 wherein each of the first and second interfaces comprises one or more SAS phys;

9 and

10 a storage to store a route table associated with each SAS phy to couple to the
11 intercontroller link, the route table containing routing information associated with the second
12 storage subsystem.

1 21. (Original) The expander of claim 20, further comprising an additional SAS phy
2 to couple to another expander in the first storage subsystem, the storage further to store a route
3 table associated with the additional SAS phy, wherein the route table for the SAS phy to couple
4 to the intercontroller link is programmed differently than the route table for the additional SAS
5 phy.

1 22. (Currently Amended) A system comprising:

2 plural storage subsystems, each storage subsystem having a means for controlling
3 access to storage devices, and a plurality of expanding means at plural levels for coupling to the
4 storage devices; and

5 means for interconnecting the expanding means in different storage subsystems to
6 enable the controlling means in one of the storage subsystems to communicate with the
7 controlling means in another one of the storage subsystems through the expanding means and the
8 interconnecting means.

1 23. (Original) The system of claim 22, wherein each of the expanding means has a
2 SAS phy to connect to the interconnecting means.